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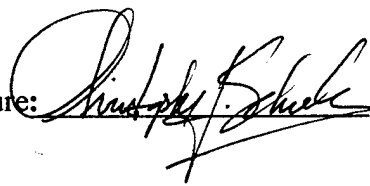
**EMPLOYING THE NEW BREED OF STAND-OFF WEAPONS
IN THE OPERATIONAL THEATER**

by

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A paper submitted to the faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

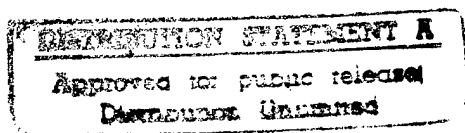
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ABSTRACT OF
EMPLOYING THE NEW BREED OF STAND-OFF WEAPONS
IN THE OPERATIONAL THEATER

Emerging technology precision stand-off weapons currently in the appropriation's process are but one element of a rising tide of evolutionary, if not revolutionary, changes in the armed forces of the U.S. What role will the new breed of stand-off weapons play in light of the currently proclaimed Revolution in Military Affairs? Possessing the characteristics of superior accuracy, low cost, flexibility, speed of employment, and stand-off force protection, the new breed of stand-off weapon can form an overwhelming projection of force in the operational fires equation.

History is replete with examples of stand-off weapons and their contribution to the armed forces they support, but almost devoid of occasions where stand-off weapons were singularly responsible for operational or strategic victory. In those instances where overwhelming stand-off weapons superiority existed, outcome at the tactical level was never in question. Despite this, a homogeneous force of stand-off weapons rarely succeeds outside the tactical level due to inherent limitations. At the operational or strategic level, it is employment of the heterogeneous, combined-arms force that ensured success. The intrinsic flexibility of a heterogeneous force, governed by a versatile doctrine and coherent organization, represents the optimum mechanism for meeting the various contingencies across the spectrum of war. Nevertheless, properly employed, the new breed of stand-off precision guided weapons can form a decisive edge for the military capable of exploiting their potential.

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INTRODUCTION

Emerging technology precision stand-off weapons are but one element of a rising tide of evolutionary, if not revolutionary changes in the armed forces of the U.S. What role will this new breed of weapon play in light of the currently proclaimed Revolution in Military Affairs or RMA? History provides few examples where employment of a revolutionary stand-off weapon system had a decisive impact on military operations at the operational or strategic level.¹ Nevertheless, analysis of successful historical stand-off weapon employment should reveal significant insight, potentially defining and enhancing their role in the operational fires equation. Operational fires are defined as:

those fires that constitute a decisive impact on the course and outcome of a major operation or campaign. . . .planned by the operational commander. . . .conducted prior to, and can continue after, the start of a major operation or campaign. . . .Lethal [operational] fires are intended to delay, disrupt, destroy or degrade the enemy forces or critical functions and facilities. . . .Non-lethal fires are intended to impair, disrupt or delay actions of the enemy forces or critical functions and facilities. . . .²

This discourse will focus on the application of stand-off weapon systems through history to glean basic elements critical to their successful employment. Once identified, these elements will form the basis for confirming existing operational doctrine, or suggest alternatives governing the role of the emerging stand-off weapon in the operational theater. Properly employed, the new breed of stand-off precision weapons will offer the operational commander a scale of power projection options not realized since the era of the English longbow's supremacy.

BACKGROUND

The New Breed

For the purposes of this discourse the new breed of stand-off weapons are defined as airborne weapons currently in some aspect of the appropriations process; the Navy's Stand-off Land Attack Missile-Expanded Response (SLAM-ER), the Joint Stand Off Weapon (JSOW) family, and the Air Force-Navy Joint Air-to-Surface Stand-off Missile (JASSM). Attributes of superior accuracy, low cost, flexibility, speed of employment, and stand-off force protection³ enhance the potential of these systems, over others, to advance the current state of U.S. military operational fires. These systems are characterized by:

1. Precision targeting technology--INS, GPS receivers, terminal IIR seekers, and man-in-the-loop terminal aimpoint selection, or automatic target recognition (ATR) software, capable of circular areas of probability within 10 feet.⁴
2. Low unit cost--from \$120,000 for the JSOW to \$400,000-\$600,00 for JASSM as compared to the Tomahawk's FY94 price of \$1.2 million⁵, and significantly less for the SLAM-ER upgrade kits.
3. Flexible employment options--due to the multitude of launch platforms. Stand-off design enables these systems to be employed from the primary fighter, attack, and patrol aircraft of the Navy and Airforce. In addition, multi-service design and appropriations have ensured flexibility through significant procurement numbers and interoperability.⁶
4. Rapid and robust delivery options--response time, speed and volume of delivery of air launched stand-off weapons are superior to that of other platforms.
5. Force protection--provided by weapon ranges of out to 100 NM for SLAM-ER, 50-60 NM for JSOW, and 150 to 180 NM for JASSM. Stand-off ranges allow for delivery vehicles to remain outside the defensive threat envelope.⁷

Setting the Stage

Decisive defeat of an enemy through the application of precision stand-off weapons, although infrequent, is not a novel concept. Nearly 3,000 years ago, the stone slinging David dispatched Goliath from well beyond the giant Philistine's reach. In the first century BC, the Roman army of Crassus was annihilated by the mounted, missile firing Parthian army one third its size. A six foot yew longbow in the hands of skilled yeoman gave the English a decided advantage over the French during The Hundred Years' War.⁸ The Mongol Kahns carved out the largest empire known with predominantly horse mounted archers.

Basking in the glow of the Gulf War, does the United States military maintain a stand-off force employment advantage similar to those expressed above? While it is exciting to believe we have reached an overwhelming position of stand-off capability, able to strike anywhere in the world with immediacy and surgical precision, supporting evidence is dubious. Captain Patton's article, "The New "RMA" It's Only Just Begun," presents a timely, poignant anecdote about our perceived versus actual potential in stand-off striking ability. Patton makes three critical observations regarding the U.S. governments early response to the bombing of the Oklahoma City Federal Building as an indicator of the breadth of misconception:

First, when the president assumed it to have been foreign-sponsored, he evidently thought that as Commander in Chief he had assets that would allow him to reach out quickly, precisely, and decisively. . . .

Second, foreign entities that might have been suspected of such a terrorist attack evidently believed that the "terrible swift sword" of instant, massive retaliation was not an idle threat and that to claim responsibility (or even be slow in denying it) was tantamount to inviting a flock of Tomahawks to their back doors.

Third, however, the United States in fact falls considerably short of being able to execute the kind of attack which American leaders and their potential adversaries seem to have believed it could: discriminate, quick, over long distances, with virtual certainty of no losses.⁹

Patton does admit the potential could be just around the corner stating, "Nevertheless, it appears possible that in the next few years the U.S. will be able to deploy integrated 'reconnaissance-strike' systems approximating such a capability, through what has been termed another 'revolution in military affairs,' or RMA."¹⁰

Revolutions in Military Affairs

The role of this discourse is not to weigh the relative merits of the ongoing arguments surrounding the perceived Revolution in Military Affairs. Nonetheless, any discussion of the future employment of stand-off weapons, operational fires, or supporting doctrine must include at a minimum, a definition of a RMA, and an example of how it might look. Current doctrines and supporting vision are linked directly to the technical and operational concepts that advocates of the current RMA profess. This enlightening definition from Andrew Krepinevich forms a foundation for introspection:

It [a RMA] is what occurs when the application of new technologies into a significant number of military systems combines with innovative operational concepts and organizational adaptation in a way that fundamentally alters the character and conduct of a conflict. It does so by producing a dramatic increase--often an order of magnitude or greater--in the combat potential and military effectiveness of armed forces.¹¹

Krepinevich defines four distinct elements that must exist for a military system to reach the revolutionary stage:

1. Technological change.
2. Systems development.
3. Operational innovation.
4. Organizational adaptation.¹²

Captain Patton refines and illustrates the popular view of the current RMA when he states,

The emerging revolution in military affairs will eventually be characterized by the capability. . .to see, appraise, and respond quickly to a military threat. . .by striking that threat, as warranted, with precision-guided munitions, even over great distances, . . .while employing an optimum but overwhelming and survivable force.¹³

Patton's vision contains five essential elements:

1. Intelligence capability to see and appraise.
2. Command and control--the ability to respond quickly.
3. Technological innovation in weapon range and precision.
4. Efficient yet overwhelming employment doctrine.
5. Force protection through survivability.¹⁴

Patton's view of a fully realized RMA meets Krepinevich's basic requirements, contains characteristics fundamental to the new breed of stand-off weapons, and tenants of current military doctrine and vision. Further exploration of those elements basic to military revolutions in the past should be instrumental in shaping coherent operational employment doctrine of similar weapons in the future.

LESSONS FROM AN HISTORICAL PERSPECTIVE

The following analyses of four famous examples of stand-off striking power focus on the superior nature of the weapon system employed, limitations, combined-arms synthesis, doctrine, training, and finally, organization.

David versus Goliath

David dispatched Goliath with a well-placed stone nearly 3000 years ago. David's precision, beyond the divine, was due to constant practice while defending his flock against predators. In preparation for his duel with the giant Philistine, David, following personal doctrine, elected not to wear the tunic, helmet, armor, and sword provided, preferring instead his shepherds apparel and staff. The cumbersome nature of the stately accouterments hindered his ability to use his sling. A lone individual, David had no command and control issues to face, but his confidence surely benefited from his faith in the system he was defending. While David bested the Philistine champion, the remainder of the Philistine army could have seized

the initiative and won the day. However, seeing the severed head of Goliath in David's hands, the Philistine army took flight.¹⁵ Goliath obviously formed the Philistine center of gravity. David alone would have been powerless to take advantage of the routed Philistines, but his comrades took up arms and killed many in pursuit, turning a tactical victory into an operational rout.

The Roman Crassus and the Parthians at Carrhae

In the first century BC, a fate similar to the Philistines befell Crassus and his 44,000 Romans invading Parthia. Interestingly, Archer Jones cites this period as the apex of the Roman legion's combat power. The Roman improvements were derived from an organization shift to a flexible and homogeneous employment plan, and a shift in authority to the lowest levels of an improved chain of command, passing subordinate initiative.¹⁶ The Parthians fought totally mounted in a time before the stirrup. Mastery of lance and bow armed cavalry skills during this period indicate tremendous efforts in discipline and training. Outnumbered three to one, the Parthian commander elected to engage Crassus on the level Mesopotamian plain utilizing only his light, bow-armed cavalry. Besieging the Romans from all sides, well beyond the reach of the legion's blades, the Parthians decimated Crassus' army. The Parthian light cavalry continued to strike from a distance while the heavy cavalry kept the Romans tightly bunched into one large target. Over the course of two days, Crassus' entire army was killed or captured. "The heavy cavalry aided the Parthian victory; but with sufficient arrows, which their commander had carefully provided, their light cavalry could have won the battle unaided."¹⁷

Nevertheless, in an attempt to capitalize on their victory, the Parthians invaded Roman-held-Syria. Unable to lay siege to fortified cities or operate in the forests, they withdrew.¹⁸

This is analogous to a modern stand-off striking force's limitations regarding topography-- unless we have intelligence assets capable of operating in a particular region, or precise detail on the geography required for pre-programmed cruise missile flight, precision stand-off forces will lack utility. In addition, the light cavalry of the modern era, strike aircraft or attack helicopters have difficulty projecting operationally significant power into mountainous, forested, or jungle terrain. The Soviet experience in Afghanistan, and the U.S. experience in Vietnam are two modern examples.

The doctrine and organization employed by the Parthians was no accident. "Not only did the Romans face a trained and elaborately prepared host but also a formidable and prudently prepared opponent in Surena, the Parthian commander."¹⁹ Surena's logistic support to his archers displayed recognition of the dominance of his weapon system on open ground, and a pre-planned doctrine to exploit it. As with most battles of antiquity, command and control was effectively assumed by one individual due to the scale of the battlefield, and the large force to space ratio. The advent of the revolution in information warfare may return the scope of control wielded by the ancient commanders to the modern military leader increasing the likelihood that an overwhelming, coordinated use of stand-off weapons can again form a vastly superior weapons system.

Crécy and Agincourt

These two engagements were similar in that the English forces drew themselves into strong defensive positions awaiting a French assault. At Crécy, almost two-thirds of the

English force were longbowmen who first eliminated the crossbow armed light infantry, then spoiled the repeated charges of the famed French cavalry, leaving the heavily armored knights and their mounts routed before the English lines.²⁰

Agincourt was essentially a repeat of Crécy with the addition of “heavy rain and ankle-deep mud on the approach to the English position.”²¹ Unlike at Crécy, the French did attempt to disperse the longbowmen with a direct cavalry charge, but “their slow advance because of the mud enabled the longbowmen to halt the horsemen. . . .”²² In addition, as the dismounted French knights approached their peers as potential ransom prospects, King Henry ordered the longbowmen to discard their bows and attack the French knights with sword and axe. Both battles ended in a rout of the French forces:

Although the rapid, powerful, and accurate shooting of the longbowmen constituted almost a secret weapon, English success did not depend on this especially light-infantry weapon system. The joint use of light and heavy infantry provides the best combination for the defense, the heavy infantry withstanding heavy cavalry and the light infantry out shooting the light cavalry.²³

The following introspective view of Crécy is applicable to every example. “It was not, after all, just the intrinsic technical superiority of the longbows that brought victory to the English at Crécy, but the interaction of that weapon with the tactics and equipment of the French.”²⁴ Archer Jones makes clear the operational effect of the decisive defeat of the French at Agincourt, “Other than raise English morale and enthusiasm for the war, the victory did nothing immediately to facilitate King Henry’s strategy of systematic conquest of French territory. . . .”²⁵ Again, we see inherent limitations in a force of predominantly missile systems. The outcome of these two battles may have been different had the French assaulted the longbowmen--the English center of gravity--instead of the wealthy ransom prospects.

The battles of Crécy and Agincourt represent another example of the ease at which a commander was able to execute his will over the entire battlefield. "In spite of the French numerical advantage of three to one, Edward, who like Hannibal or Scipio directed the battle from his vantage point atop a windmill, never used his reserve."²⁶ If the U.S. military intelligence and information transfer assets can place the operational commander atop the "windmill", coordinated, overwhelming stand-off striking power can be accomplished at the operational level, enormously enhancing the synergism of the combined-arms force.

The Great Kahns

Unlike the preceding examples, Mongol combat systems succeeded well beyond the tactical level. For almost two hundred years the Mongol empire stood on the strength of a force composed almost entirely of cavalry. Martial skills, primarily the bow, were instilled from birth in Mongol society.²⁷ Mongolian cavalymen were renowned archers; nevertheless, along with the composite bow and up to three quivers of arrows, the Mongols were self contained combined-arms units equipped with crude stirrups, lance, saber, dagger, lightweight armor, and a small shield.²⁸ While fully capable of defeating any army in the field with stand-off power, "Firing as many as six arrows a minute, 70,000 Mongol cavalymen slaughtered a Jin army blocking their way into Northern China. . ."²⁹ details of the different methods--on and off the field--of Mongol conquest are beyond the scope of this discourse. Nonetheless, several useful themes resonate through their highly successful style of waging war. Wholesale destruction, massacre, and terror were hallmarks of Mongol empire building. Often, the Mongol's fierce reputation precluded the need to attack defended cities. When confronted with well-defended obstacles, the Mongols often feigned retreat to lure the enemy out and into

an ambush, or used their extensive siege technology to invest those who remained behind their walls.³⁰ While the relatively homogeneous Mongol army was truly a superior weapon system, it's obvious the Mongols accomplished their operational objectives through a variety of methods including combined-arms, psychological, diplomatic, and despotic practices.

Like the Roman armies of Caesar and Crassus during the First Century BC, Genghis Kahn forged a well articulated, disciplined army.³¹ Creation of a flexible organization designed to push authority as low as possible, yet maintain a firm chain of command enabled the Mongols, like the Romans, to have the ability to deploy multiple forces with unity of effort to accomplish their operational and strategic objectives.

Historical Summation

In each case study, the bonding nature of subtle combined-arms synthesis existed as a supporting layer below the superior weapon systems glossy sheen. In addition, sound doctrine and extensive training were essential to effective force employment. Matters of organization varied, but the organization utilized retained cognizance of purpose and command throughout their operations. The following are points gleaned from the historical case studies:

1. Stand-off weapons must operate within a combined-arms operational doctrine against a relatively capable enemy to succeed at the operational level.
2. Stand-off weapons employment may coerce or influence relatively weak enemies, meeting operational goals through economy of force and reduced risk.
3. Battlefield awareness is essential to fuse the stand-off component into the combined-arms equation, whether it be from the top of a windmill, hill, or behind a computer generated display.
4. Training to the point of mastering the skills of tactical employment, and operational planning is essential.
5. Swift and overwhelming application of stand-off weapons is most effective.

6. Doctrine and organization that implements mission rather than task related orders enhance the speed and ferocity of attack due to individual initiative.

A MODERN PERSPECTIVE

The Gulf War unveiled the tremendous advantage high technology operational fires can provide joint and coalition commanders. The addition of emerging technology stand-off weapons to the joint commander's operational fires equation can significantly enhance current levels of power projection. In the development of coherent courses of action, demand for control of these assets will come from all levels, exacerbating command and control issues. Development of a symmetry between strategic, operational, and tactical control of stand-off weapons will ensure the most productive management of these systems. Captain Patton eloquently states the current problem of command and control doctrine in light of the RMA:

With what weapon, from what platform, under whose command, and with whose permission will the attack be conducted? These pesky sub-questions have been traditionally swept up as loose ends by the ubiquitous "C3"--command, control, and communications--euphemism, the inadequacies of which are all too easily wished away by adding another C, for computers, or I, for Intelligence³²

Nevertheless, the Gulf War demonstrated that our modern military possesses the potential to execute the robust operational fires the new breed of stand-off weapon portends.

With bombing plan in hand, General Schwarzkopf came face to face with the validity of the combined-arms assertion, when in early October 1990 he observed, "Saddam's forces were becoming more and more entrenched, and you didn't have to be Clausewitz to realize we needed a plan for a ground offensive."³³ General Powell, in an address to the House Armed Services Committee, stressed maintaining the initiative:

Many experts and others in this town believe that [our objectives] can be accomplished by surgical air strikes or sustained air campaigns without the use of other forces, particularly ground forces. The fundamental flaw in such strategies is that they leave initiative in Saddam's hands. . . .³⁴

Nevertheless, as leading candidate for the role of weapon delivery vehicle in the currently proclaimed RMA,³⁴ the stand-off precision guided weapon can be decisive, dismantling the enemy's critical vulnerabilities, or striking directly at the center of gravity itself. In planning for Instant Thunder, the Gulf War's initial coalition air operation, General Schwarzkopf made the following analysis:

But at the very top of our target list were the bunkers where we knew he and his senior commanders were likely to be working. Because of Iraq's highly centralized system of command and control, Saddam was...an enemy center of gravity...that, if destroyed, will cause the enemy to lose its will to fight.³⁵

Forming the supporting cornerstone of stand-off weaponry is information, or knowledge superiority. As prime mover in the RMA, knowledge superiority,³⁶ in concert with supportive doctrine, organization, and training, will furnish operational commanders the means to decisively employ the new breed of stand-off weapon. Although high-tech, precision guided stand-off weapons have been part of the power projection equation for some time, their cost, timeliness in employment, and limited accuracy have restricted their utility to aspects well below the overwhelming threshold. The addition of the new breed of stand-off precision guided weapons to the U.S. arsenal will test the ability of joint force fire coordinators and their tactical air control systems to produce Air Tasking Orders (ATO) that include a much broader range of platforms, services, and weapons into a coherent, deconflicted, overwhelming deep strike.

CURRENT DOCTRINE

In *Joint Vision 2010*, the Chairman of the Joint Chiefs of Staff delivered the following conceptual vision of stand-off weapon employment, affirming the key role the new breed of

stand-off weapons will play:

Long-range precision capability, combined with a wide range of delivery systems, is emerging as a key factor in future warfare. . . .enhanced stand-off capabilities will provide increased accuracy and a wider range of delivery options. These capabilities will increase the combat power available for use against selected objectives, . . .³⁸

The Chairman also addresses the concept of the commander's knowledge of the battlefield, affirming the need to broaden the commander's vision of the battlefield to bring stand-off technology's impact to fruition:

Improvements in information and systems integration technologies will also significantly impact on future military operations by providing decision makers with accurate information in a timely manner. . . .Forces harnessing the capabilities potentially available from this system of systems will gain dominant battlespace awareness, an interactive "picture" which will yield much more accurate assessments of friendly and enemy operations.³⁹

Finally, the Chairman's joint vision mandates a more robust combined-arms integration than has been accomplished since the Goldwater-Nichols Department of Defense Reorganization Act of 1986, ". . .we must be fully joint: institutionally, organizationally, intellectually, and technically."⁴⁰ The Joint Publication series and respective service doctrines place similar emphasis on the combined-arms, maneuver, and technical approach to employing operational art. The Army's Depth and Simultaneous Attack Battle Lab has initiatives that focus on, "defining requirements to detect and identify enemy forces throughout the depth of the battlefield; conveying that information in near real-time from the sensors to engagement systems; and conducting unilateral and joint precision strikes to defeat them."⁴¹ In addition, work continues on projects such as, "live, virtual and constructive simulations to demonstrate current, emerging and advanced technology to defeat a high priority threat in a specific theater of operations. Work also continues on compressing sensor-to shooter timelines, and design

and experimentation with the Deep Operations Coordination Cell (DOCC).”⁴² The following are characteristic of current doctrine and published vision:

1. Precision targeting limiting collateral damage, and providing economy of force.
2. Fighting leaner and smarter in a reduced fiscal climate.
3. Complete battlespace awareness through intelligence and information technologies.
4. Combined-arms--joint operations emphasizing operational art.
5. Fused command and control systems with near real-time information transfer.

SUMMARY

Comparing and contrasting the historical lessons learned with current vision and doctrine reveals compatibility in several areas; combined-arms joint operations, complete battlefield awareness, and the swift application of overwhelming force. Nevertheless, two critical areas are either divergent or diametrically opposed. First, the effect of increased fiscal constraints on training may limit the ability of warfighters to truly master skills required for the swift, deconflicted application of stand-off power. Realistic, dedicated training must remain as high as possible on the budget priority list. Second, the ATO and the concept of complete battlespace awareness breed task specific command and control rather than mission oriented tasking. This problem is compounded, especially in coordination of operational fires, by the additional weapon systems coming into service, and the increased number of platforms capable of employing them. The immense volume of data that must be collected, assimilated, reformatted, and distributed to conduct operational fires of this magnitude will require the battlespace awareness capabilities that the Joint Commander, and the RMA envision. Given time, the ATO process, although not perfect, managed to persevere even as the Coalition approached a thousand aircraft sorties per day in the Gulf War. Returning to the historical lessons and current doctrine, it's the swift and overwhelming application of force that is most

decisive. It is exactly this capability that forms the potential revolutionary aspect of the new breed of stand-off weapon. The United States and our coalition partners may not have four months to plan the next operation. In fact, history, doctrine, and the tenants of the RMA advocate the essential quality of speed as an influence multiplying tool, designed to bring the enemy to their knees as quickly and efficiently as possible. In other words, with speed of force projection, we maintain the initiative from conflict inception to war termination. Naturally, continued advances in technology, adherence to doctrine, and effective training that establishes the required battlespace awareness will enable the new breed of stand-off weapons to play that key role in the operational fires and force projection equation. In the meantime, we must rely on the task oriented structure in place or, at the operational level, provide subordinate commanders the authority and responsibility to execute operational fires and force projection through the less specific mission type tasking. Subordinate commanders would then be responsible for target and airspace deconfliction through geographic and or time separation. While not the most optimum course of action, this will permit the speed and volume aspects of the new breed to be fully realized.

CONCLUSIONS

Inviting as the notion of risk free, precision stand-off striking power is, the lessons of history display inherent limitations on military operations solely dependent on stand-off systems for power projection. The evidence presented is clear, the intrinsic flexibility of a heterogeneous combined-arms force, governed by a versatile doctrine and coherent organization, represents the optimum mechanism for meeting the various contingencies across the spectrum of war. Nevertheless, the new breed of stand-off weapon, characterized by

superior accuracy, low cost, flexibility, speed of employment, and stand-off force protection, is ideally suited to fill a key role in the power projection philosophy of *Joint Vision 2010*, and current service doctrine. In addition, joint and service doctrine, research and development initiatives, and visions presented, except where noted, fall directly in-line with the tenants of success deduced from the historical case studies.

Derived from this discourse are three fundamental principles worthy of highlighting:

- 1. Stand-off weapons are most effective when used en masse. This principle should be more clearly addressed in stand-off weapon doctrine.**
- 2. Battlespace awareness is required to effectively employ stand-off weapons en masse. The U.S. military does not currently possess the degree of battlespace awareness required, but is rapidly progressing toward that capability.**
- 3. Regardless of the levels of stand-off power we are able to project, only combined-arms forces can accomplish operational objectives in war.**

The addition of the new breed of stand-off precision guided weapons to the U.S. arsenal can provide the operational commander with a range of options across the scope of force projection including the overwhelming use of stand-off striking ability to attack directly, or indirectly at the enemy's center of gravity.

NOTES

¹ Archer Jones, *The Art of War in the Western World* (New York: Oxford University Press 1987), 697.

² "Glossary of Operational Terms," Unpublished glossary, U.S. Naval War College, Newport RI: 1996, 20.

³ Glenn W. Goodman, "Long Reach," *Armed Forces Journal International*, June 1996 [journal on-line]; available from <http://www.afji.com/mags/1996/June/Long.html>; Internet; accessed 18 December 1996.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

⁷ Ibid.

⁸ Andrew F. Krepinevich, "Cavalry to Computer: The Pattern of Military Revolutions," *The National Interest*, Fall 1994, 31.

⁹ James H. Patton Jr., "The New "RMA" It's Only Just Begun," *Naval War College Review*, Spring 1996, 23-24.

¹⁰ Ibid.

¹¹ Krepinevich, 30.

¹² Ibid.

¹³ Patton, 25.

¹⁴ Ibid.

¹⁵ I Samuel 17: 34-54 NIV.

¹⁶ Jones, 34-35.

¹⁷ Ibid. 38.

¹⁸ Ibid.

¹⁹ Ibid. 36.

²⁰ Ibid. 633.

²¹ Ibid. 170.

²² Ibid.

²³ Ibid. 171-172.

²⁴ Van Creveld, cited in David Jablonsky, *The Owl of Minerva Flies at Twilight: Doctrinal Change and Continuity and the Revolution in Military Affairs* (Carlisle Barracks: Strategic Studies Institute 1994), 14.

Jones, 171.

²⁶ Jones, 164.

²⁷ Mike Edwards, "Genghis Kahn," *National Geographic*, December 1996, 25.

²⁸ Ibid. 14.

²⁹ Ibid. 25.

³⁰ Ibid. 25-33.

³¹ Ibid. 25

³² Patton, 27.

³³ H. Norman Schwarzkopf and Peter Petre, *It Doesn't Take a Hero* (New York: Linda Grey Bantam Books 1992), 354.

³⁴ Harry G. Hammes, *A Critical Analysis of the Gulf War* (New York: Dell Publishing 1992), 198.

³⁵ Colin S. Grey, "The Changing Nature of Warfare?," *Naval War College Review*, Spring 1996, 16.

³⁶ Schwarzkopf, 318-319.

³⁷ Grey, 9.

³⁸ Office of the Chairman of the Joint Chiefs of Staff. *Joint Vision 2010*. (Washington: 1995), 11.

³⁹ Ibid. 13.

⁴⁰ Ibid. 9.

⁴¹ U.S. Army Training and Doctrine Command, *Depth and Simultaneous Attack Battle Lab*, Oct 1996 [journal on-line]; available from <http://www.pica.army.mil/orgs/battlelabs/dsable.html>; Internet; accessed 18 December 1996.

⁴² Ibid.

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